

VEKUA, I.N., akademik

Conditions for a momentless state of strained equilibrium of
a convex shell. Soob. AN Gruz.SSR 20 no.5:525-532 My '58.
(Elastic plates and shells) (MIRA 11:10)

VEKUA, I.N., akademik

~~Conditions of momentless convex shells. Soob. AN Gruz. SSR 21~~
no. 6: 649-652 D '58. (MIRA 12:4)

1. AN SSSR, Matematicheskiy institut im. V.A. Steklova, Moskva.
(Elastic plates and shells)

38-22-2-2/8

AUTHOR: Boyarskiy, B.V. and Vekua, I.N.

TITLE: Proof of the Rigidity of Piecewise-Regular Closed Convex Surfaces of Nonnegative Curvature (Dokazatel'stvo zhestkosti ku-sochno-regulyarnykh zamknytykh vypuklykh poverkhnostey neot-ritsatel'noy krivizny)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya Matematicheskaya, 1958, Vol 22, Nr 2, pp 165-176 (USSR)

ABSTRACT: Let $\vec{X} = \vec{X}(u,v)$ be the equation of a regular surface S which is limited by a finite number of piecewise smooth simple curves L_0, L_1, \dots, L_m . Furthermore let $\vec{Y} = \vec{Y}(u,v)$ and $\vec{Z} = \vec{Z}(u,v)$ be the fields of displacement and of rotation which correspond to an infinitely small deformation of the surface. Then it is $d\vec{Y} = \vec{Z} \times d\vec{X}$, $d\vec{X} \cdot d\vec{Y} = 0$, from which Blaschke [Ref 1] with the aid of the Ostrogradsky-formula obtains the following relation:

$$(1) \quad 2 \iint_S \left(\vec{X} \cdot \vec{Z}_u \vec{Z}_v \right) du dv = \int_L \vec{X} \cdot \vec{Z} dZ$$

where L denotes the totality of the L_1 .

Card 1/ 2

Proof of the Rigidity of Piecewise-Regular Closed Convex Surfaces of Nonnegative Curvature 38-22-2-2/8

The authors consider closed convex surfaces which are combined together from a finite number of regular surface elements with nonnegative Gauss curvature. By application of (1) (in a somewhat varied form) to each regular part of the surface and by addition the rigidity is proved at first for the case that the limiting contours of the single partial pieces are Jordan curves and then for the general case. At first conical points are excluded. Then it is shown by a limit passage that the proof even holds in presence of conical points. There are 2 references, 1 of which is Soviet, and 1 German.

SUBMITTED: April 1, 1957

AVAILABLE: Library of Congress

1. Surfaces—Mathematical analysis

Card 2/2

16(1)

PHASE I BOOK EXPLOITATION

SOV/2760

Vekua, Il'ya Nestorovich

Obobshchennyye analiticheskiye funktsii (Generalized Analytical Functions) Moscow, Fizmatgiz, 1959. 628 p. Errata slip inserted. 6,000 copies printed.

Eds.: B. V. Boyarskiy and E. G. Poznyak; Tech. Ed.: N. A. Tumarkina.

PURPOSE: This book is intended for students taking advanced university courses in mechanics and mathematics, Aspirants, and scientific workers.

COVERAGE: The author studies the fundamentals of the general theory of generalized analytic functions and gives certain applications of the theory to problems of differential geometry and the theory of shells. This book contains many results achieved by the author and his students which are published for the first time. The supplement to Chapter 4 was written by B. V. Boyarskiy. The author thanks V. S. Vinogradov, L. S. Klabukova, Sun Ho-sheng, Tong, Yon-

Card 1/9

Generalized Analytical (Cont.)

SOV/2760

chol Yu. P. Krivenkovy, A. V. Bitsadze, B. V. Boyarskiy, I. I. Danilyuk, and E. G. Poznyak for their help in preparing the book. There are 97 references: 64 Soviet, 13 German, 10 English, 8 French, 1 Rumanian, and 1 Italian.

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AVAILABLE: Library of Congress

Card 9/9

LK/mmh
1-14-60

VEKUA, I.H.

Remarks on properties of solutions to the equation $\Delta u = -2\lambda e^u$.
Sib. mat. zhurn. 1 no.3:221-242 3-4 '66. (MIA 14:2)
(Geometry, Differential) (Functional equations)

BITSADZE, A.V., red.; VEKUA, I.N., red.; KUDRYAVTSEV, L.D., red.;
MIGIRENKO, G.S., red.; RABOTNOV, Yu.N., red.; KHRISTIANOVICH,
S.A., red.; ALEKSANDROVSKIY, B.M., red.; NAZARYANTS, T.F.,
red.; VYALYKH, A.M., tekhn. red.; LOKSHINA, O.A., tekhn. red.

[Some problems in mathematics and mechanics] Nekotorye pro-
blemy matematiki i mekhaniki. Novosibirsk, Izd-vo Sibirskogo
otd-nie AN SSSR, 1961. 265 p. (MIRA 15:2)

1. Akademiya nauk SSSR. Sibirskoye otdeleniye.
(Mathematics) (Mechanics)

LAVRENT'YEV, M.A., otv.red.; MIKHAYLOV, G.K., red.; BITSADZE, A.V.,
red.; YEKUA, I.M., red.; DZHANGELIDZE, G.Yu., red.; LUR'YE, A.I.,
red.; MANDZHAVIDZE, G.P., red.; MIKHAYLOV, G.K., red.; SEDOV, L.I.,
red.; SOBOLEV, S.L., red.; SOKOLOVSKIY, V.V., red.; KHRISTIANOVICH,
S.A., red.; SHERMAN, D.I., red.; RYVKIN, A.Z., red.izd-va;
VOLKOVA, V.V., tekhn.red.

[Problems in the mechanics of solids] Problemy mekhaniki sploshnoi
sredy; k semidesiatiletiiu akademika N.I.Muskhelishvili. Moskva,
1961. 577 p. (MIRA 14:3)

1. Akademiya nauk SSSR.
(Mechanics, Analytic) (Elastic solids)

S/763/61/000/000/005/013

AUTHOR: Vekia, I.N.

TITLE: Contribution to the theory of quasi-conformal representations.

SOURCE: Nekotoryye problemy matematiki i mekhaniki. Novosibirsk, Izd-vo Sib. otd. AN SSSR, 1961, 57-68.

TEXT: Reference is made to M. A. Lavrent'yev's analytical and geometrical methods which constructed, in a certain sense, a definitive theory of quasi-conformal representations. The present paper develops a different approach to these problems, as an extension to the author's earlier work (AN SSSR, Dokl., v. 100, no. 2, 1955, 197-200; and Obobshchennyye analiticheskiye funktsii [Generalized analytical functions]. Fizmatgiz, Moscow, 1959), which is based on the utilization of the properties of some singular integrals (Calderon, A., Zygmund, A., Am. J. Math., no. 78, 1956, 289-309). The method is distinguished by its ability to permit an effective construction of quasi-conformal representations for prescribed characteristics. Upon defining the purpose of the theory of quasi-conformal representations as the study of the properties of a special class of topological representations of a region of a surface of one complex variable in the region of another complex variable, the problem of the construction of the quasi-conformal representation with a specified

Card 1/2

Contribution to the theory of quasi-conformal

S/763/61/000/000/005/013

characteristic is reduced to the problem of finding the solutions of a Beltrami equation, which accomplish the topological mapping of one region into another and which the author terms the homeomorphisms of the Beltrami equation. An expression is provided for the generalization of the solution of the Beltrami equations which permits the expansion of the generalization of many properties of the analytical functions of one complex variable to the solutions of Beltrami equations. For example, without changes such important properties are conserved as the principle of the argument, the principle of the maximum modulus, the theory of uniqueness (the isolations of the nulls), et al. There are 5 references (3 Russian-language Soviet and 2 English-language, of which one in Russian translation).

Card 2/2

VEKUA, I.N.

Some properties of solutions of the Gauss equation. Trudy Mat.inst.
64:5-8 '61. (MIRA 15:3)

(Curvature) (Geometry, Differential)

Uekua, I. N.

PHASE I BOOK EXPLOITATION SOV/6201

29

Vsesoyuznyy s"yezd po teoreticheskoy i prikladnoy mekhanike. 1st, Moscow, 1960.

Trudy Vsesoyuznogo s"yezda po teoreticheskoy i prikladnoy mekhanike, 27 yanvarya -- 3 fevralya 1960 g. Obzornyye doklady (Transactions of the All-Union Congress on Theoretical and Applied Mechanics, 27 January to 3 February 1960. Summary Reports). Moscow, Izd-vo AN SSSR, 1962. 467 p. 3000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Natsional'nyy komitet SSSR po teoreticheskoy i prikladnoy mekhanike.

Editorial Board: L. I. Sedov, Chairman; V. V. Sokolovskiy, Deputy Chairman; G. S. Shapiro, Scientific Secretary; G. Yu. Dzhanelidze, S. V. Kalinin, L. G. Loytsyanskiy, A. I. Lur'ye, G. K. Mikhaylov, G. I. Petrov, and V. V. Rumyantsev; Resp. Ed.: L. I. Sedov; Ed. of Publishing House: A. G. Chakhirev; Tech. Ed.: R. A. Zamarayeva.

Card 1/13

Transactions of the All-Union Congress (Cont.)

SOV/6201

(25)

PURPOSE: This book is intended for scientific and engineering personnel who are interested in recent work in theoretical and applied mechanics.

COVERAGE: The articles included in these transactions are arranged by general subject matter under the following heads: general and applied mechanics (5 papers), fluid mechanics (10 papers), and the mechanics of rigid bodies (8 papers). Besides the organizational personnel of the congress, no personalities are mentioned. Six of the papers in the present collection have no references; the remaining 17 contain approximately 1400 references in Russian, Ukrainian, English, German, Czechoslovak, Rumanian, French, Italian, and Dutch.

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- Card 2/3

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SOV/6201

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Card 5/6 1/3

VEKUA, I.N., akademik

New principles of teaching. Nauka i zhizn' 29 no.1:7 Ja '62.
(MIRA 15:3)

1. Rektor Novosibirskogo gosudarstvennogo universiteta.
(Novosibirsk University)

VEKUA, I.N., akademik

Fixed singular points of generalized analytic functions. Dokl.
AN SSSR 145 no.1:24-26 J1 '62. (MIRA 15:7)
(Functions, Analytic)

VEKUA, I.N., akademik

University at the Siberian Science Center. Vest. AN SSSR
34 no.6:12-20 Je '64 (MIRA 17:8)

1. Rektor Novosibirskogo universiteta.

VEKUA, Il'ya Nestorovich

[Fundamentals of tensor analysis; materials for the special course "Mathematical theory of shells" (read to students of Novosibirsk State University)] Osnovy tenzornogo analiza; materialy k spetskursu "Matematicheskaya teoriya obolochek" (prochitan dlia studentov NGU). Novosibirsk, Novosibirskii gos. univ., 1964. 138 p. (MIRA 18:12)

"APPROVED FOR RELEASE: 09/01/2001

CIA-RDP86-00513R001859310007-7

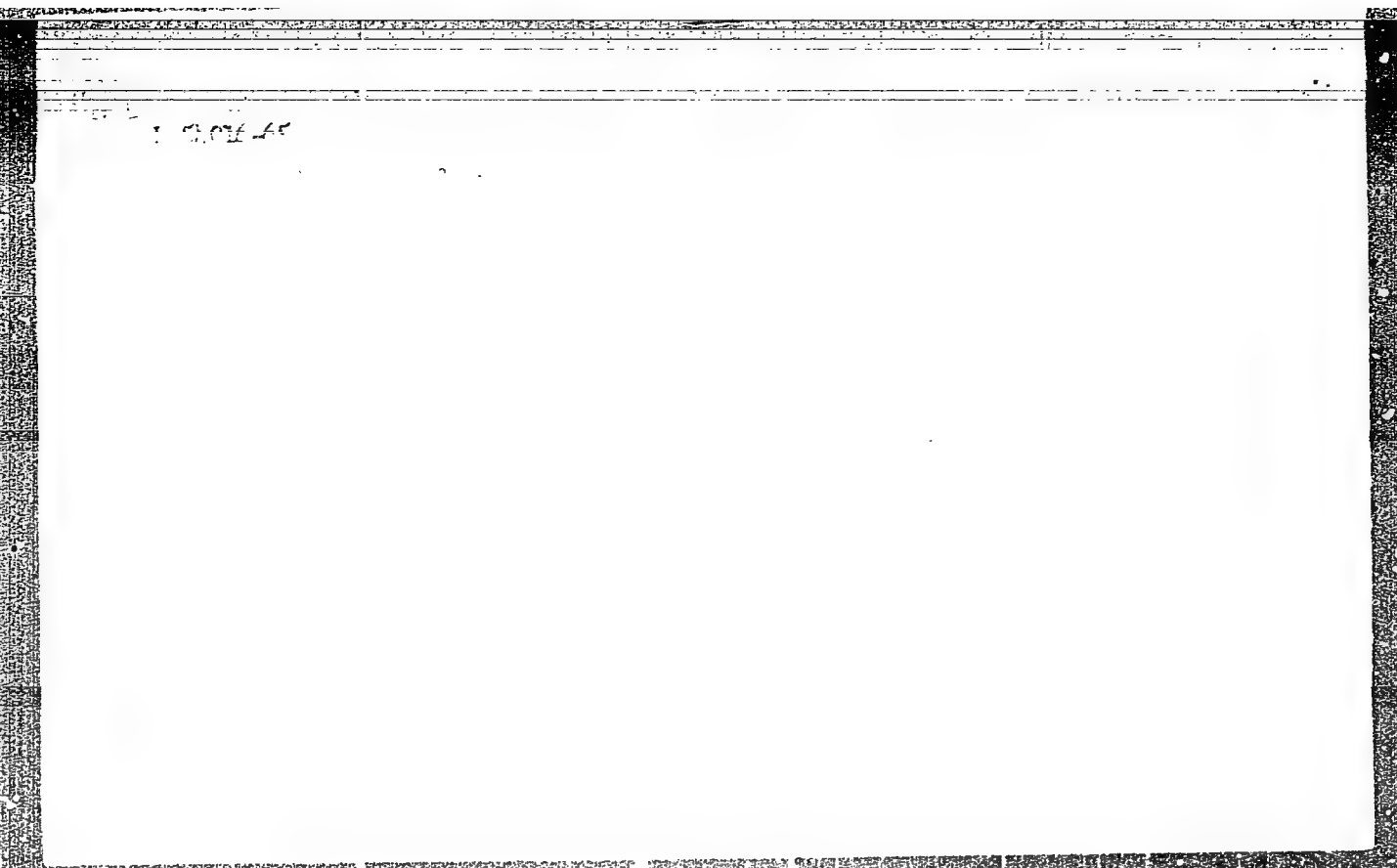
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VEKUA, Il'ya Nestorovich

[A variant of the thin shallow shells theory; lectures
for a specialized course "Mathematical theory of shells"]
Ob odnom variante teorii tonkikh plogikh obolochek; lek-
tsii po spetskursu "Matematicheskaya teoriya obolochek."
Novosibirsk, Novosibirskii gos.univ., 1964. 67 p.
(MIRA 17:11)

VEKUA, Il'ya Nestorovich

[Theory of thin and shallow shells of variable thickness;
lectures for a special course in the "Mathematical theory
of shells] Teoriia tonkikh i plogikh obolochek peremen-
noi tolshchiny; lektsii po spetskursu "Matematicheskaiia
teoriia obolochek." Novosibirsk, Novosibirskii gos.univ.,
1964. 38 p. (MIRA 17:10)

3,9110

S/169/62/000/005/034/093
D228/D307

AUTHORS: Nodia, M. and Vekua, L.

TITLE: Results of investigating the secular variation at points near the Dushetskaya magnitnaya observatoriya (Dusheti Magnetic Observatory)

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 5, 1962, 28, abstract 5G201 (Tr. Tbilissk. un-ta, 86, 1960, 57-62)

TEXT: The results of investigations of local anomalies of the secular variation, carried out in 1952-1955 and 1958, are stated. The values of ΔZ were determined by a vertical magnetic balance on 9 traverses, on which the points of observation were located every 2 - 3 km. It is concluded that each point has its individual secular variation of an oscillatory character, as a result of which the secular variation for nearby points may appear to be approximately identical over a somewhat long interval of time.
/Abstracter's note: Complete translation./

Card 1/1

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VEKHA, L. M.

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CIA-RDP86-00513R001859310007-7"

MODIA, M.Z.; VEKUA, L.V.

Methodology for use in studying paleomagnetic changes.
Soob.AN Gruz.SSR 23 no.3:277-279 8 '59.
(MIRA 13:3)

1. Tbilisskiy gosudarstvennyy universitet im.Stalina. Pred-
stavleno akademikom V.D.Kupradse.
(Magnetism, Terrestrial)

VEKUA, I.V.

Some results of paleomagnetic investigation of eruptive rocks in
Georgia. Izv. AN SSSR. Ser. geofiz. no.11:1668-1673 N '61.
(MIRA 14:11)

1. Tbilisskiy gosudarstvennyy universitet im. Stalina.
(Georgia--Rocks--Magnetic properties)

L 05249-67 ENT(1)/FUC GW

ACC NR: AP6018934

(N)

SOURCE CODE: UR/0203/66/006/003/0613/0614

AUTHOR: Nodia, M. Z.; Vekua, L. V.; Chelidze, Z. A.; Pavlenishvili, Ye. Sh.

ORG: Tbilisi State University (Tbilisskiy gosudarstvennyy universitet)

TITLE: A method for studying the secular variations of the Earth's magnetic field before our era

SOURCE: Geomagnetizm i aeronomiya, v. 6, no. 3, 1966, 613-614

TOPIC TAGS: geomagnetic field, earth magnetic field, secular variation, paleontology

ABSTRACT: In order to obtain data on the secular variations of the Earth's magnetic field before our era, the authors collected more than 300 samples of 50 objects, for six of which the directions of the astronomic meridian were determined. Since these objects were only roughly dated, they could not be subjected to conventional research techniques and a new method for studying the secular variations of accumulation on the basis of these objects had to be devised. Recent theoretical work indicates that the absolute intensity value of the earth's magnetic field undergoes variations, the periodicity of which has yet to be established. On the basis of paleomagnetic data it may be assumed that this period is not less than 5,000 years, while the period of secular accumulation variations is in the order of 1,000 years. It one uses as a point of

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UDC: 550.384

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ACC NR: AP6018934

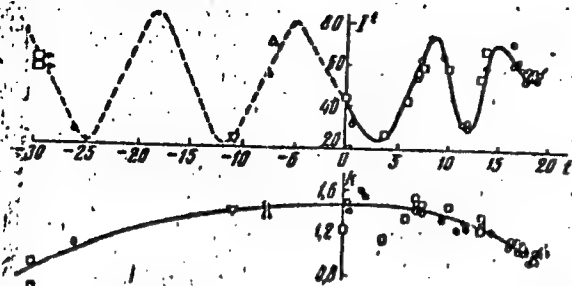


Fig. 1

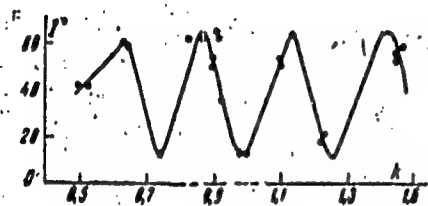


Fig. 2

departure the curve $k = f(t)$ before our era (Fig. 1) and if a curve $I = f(t)$ is plotted in conformity with measured values, such a curve will appear as shown in Fig. 2. It is clear from an analysis of this curve that the character of the cumulative change was sinusoidal even before our era for the territory of the Georgian SSR, while the double amplitude lies in a range of 10–60°. If these results are compared with S. P. Burlatskaya's curve (Sb. "Magnetizm gornykh porod i paleomagnetizm". Izd-vo SO AN SSSR, 1963, 245), all the points will be found to lie on Burlatskaya's hypothetical curve (Fig. 3). The points for samples ascribed to the earliest eras, for which $k = 0.5$, agree well with the logical extension of the $k = f(t)$ curve, by which they can be tentatively dated as belonging to the 35th century B. C. The

Card 2/3

L 05249-67

ACC NR: AP6018934

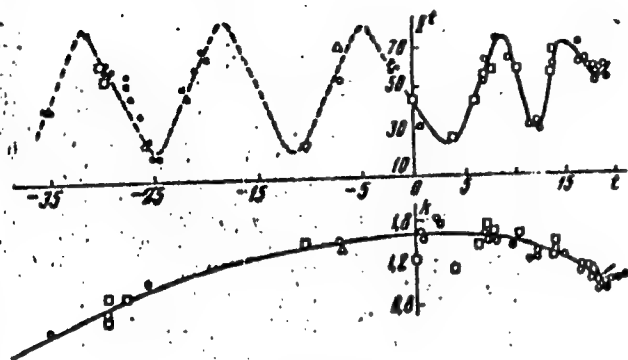


Fig. 3

cumulative value of these items, equal to $39-40^\circ$, falls quite satisfactorily on the descending branch of the sine curve $I = f(t)$ (Fig. 3). Thus, complete agreement is observed between the authors' results and those of Burlatskaya. In conclusion, the authors wish to express their gratitude to G. N. Petrova and S. P. Burlatskaya for their help. Orig. art. has: 3 figures.

SUB CODE: 08/ SUBM DATE: 08Jul65/ ORIG REF: 005

Card

3/3

gd

MARUASHVILI, G.M.; BAKRADZE, T.L.; KANDSIKI, N.S.; VEKUA, M.A.; KARDAVA, A.G.

Quinocide therapy in malaria. Med. parazit. i parazit. bol. 27 no.4:
406-408 J1-Ag '58. (MIRA 12:2)

1. Iz Nauchno-issledovatel'skogo instituta malyarii i meditsinskoy
parazitologii imeni prof. S.S. Vitsaladze (dir. - prof. G.M. Maruash-
vili), Respublikanskoy sanitarno-epidemiologicheskoy stantsii Abkhaz-
skoy ASSR (glavnyy vrach V.L. Gvaliya) i Zuglidskoy rayonnoy sanitarn-
no-epidemiologicheskoy stantsii (glavnyy vrach B.K. Gobechiya).
(ANTIMALARIALS, ther. use,
quinocide Rus))

VEKUA, M. A., ZEMIN, I. A. and SERNOVA, G. P.

"Treatment of Using Domestic Cheopodium Oil in Cases of Ascaridiasis and Ancylostomiasis", Med. Paraz. i Paraz. Bolez., Vol. 17, No. 5, pp 433-34, 1948.

VEKUA, M. A., TSETSKHLADZE, M. I. and SMIRNOVA, G. F.

"Treatment of Ancylostomiasis With Chenopodium Oil", Med. Paraz. i Paraz. Bolez.,
Vol. 17, No. 5, pp 434-35, 1948.

VEKUA, M.L.

New species of Ostracoda from Cimmerian deposits in Abkhaz.
Sob. AN Gruz. SSR 39 no.2:371-373 Ag '65. (MIRA 1966)

1. Institut paleobiologii AN Gruz. SSR. Submitted February 12,
1965.

VEKUA, N. I., Candidate Med Sci (diss) -- "The effect of bottled Avadkhar mineral water (drilled well No 1) on the external secretory function of the pancreas of patients with chronic cholecystitis and gastritis". Moscow, 1959. 11 pp (Min Health RSFSR, State Inst of Spa Studies and Physiotherapy), 200 copies (KL, No 24, 1959, 149)

Integral'nyye uravneniya tipa vol'-terra s integralom v sryzle adamara. Tbilisi,
soobshch. Gr. fil. an, 1 (1940), 508.

SO: Mathematics in the USSR, 1917-1947

edited by Kurosh, A. G.

Markushevich, A. I.

Rashevskiy, I. K.

Moscow, Leningrad, 1948

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VEKUA, N.P.

Generalization of a Hilbert boundary problem for several unknown functions. Soob.AN Gruz.SSR 8 no.9/10:577-584 '47. (MIRA 9:7)

1.Akademiya nauk Gruzinskoy SSR, Tbilisskiy matematicheskiy institut imeni A.M.Razmadze. Predstavleno akademikom N.I.Muskhelishvili.
(Differential equations) (Integral equations)

VEKUA, N.P.

A generalized system of singular integral equations. Soub. AN Gruz. SSR
9 no.3:153-160 '48. (MLRA 9:7)

1. Akademiya nauk Gruzinskey SSR, Tbilisskiy matematicheskiy institut
imeni A.M. Razmadze.
(Integral equations)

Vekua, N. P. The generalized Hilbert boundary problem for several unknown functions. Akad. Nauk Gruzin. SSR. Trudy Tbiliss. Mat. Inst. Razmadze 16, 81-103 (1948). (Georgian. Russian summary)
"The basic results have been announced in the Soobsheniya Akad. Nauk Gruzin. SSR 8, 577-584 (1947)" [see the paper reviewed above].

From the author's summary.

50: MATHEMATICAL REVIEW (Unclassified)
Vol XIV No 2, Feb 1953 pp 121-232

Vekua, N. "On certain marginal problems of the theory of the logarithmic potential," Trudy Tbilis. gos. un-ta im. Stalina, Vol. XXXIV, a-c, 1948, p. 311-27, (In Georgian, resume in Russian)
SO: U-1934, 29 Oct 53, (Letopis 'Zhurnal 'nykh Statey, N. 16, 1949).

"APPROVED FOR RELEASE: 09/01/2001

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APPROVED FOR RELEASE: 09/01/2001

CIA-RDP86-00513R001859310007-7"

VEKUA, N. P.

"Hilbert's Boundary Problem for Several Unknown Functions in the Case of
Unconnected Regions," Soob. AN Georgian SSR, No.11, pp. 533-538, 1950

Mathematical Review, Vol. 14, No.8, pp. 713-830, 1953

VEKUA, N. P.

Mathematical Reviews
Vol. 14 No. 8
Sept. 1953
Analysis

6-23-54
LL

Vekua, N. P. On a problem of Hilbert with discontinuous coefficients and its application to singular integral equations. *Akad. Nauk Gruzin. SSR. Trudy Mat. Inst. Razmadze* 18, 307-313 (1931). (Russian. Georgian summary)

Let L be a regular closed contour, bounding a connected domain D^+ in the plane ω ; $D^- = \omega - (D^+ + L)$; $\phi(z)$ is piecewise analytic if $\phi(z)$ is analytic in D^+ and in D^- (for $z \neq \infty$) and if ϕ can be continuously extended on L from either side, except perhaps for a finite number of points c_i in the vicinity of which $\phi(z) = O(|z - c_i|^{-\alpha})$ ($0 \leq \alpha < 1$). The problem considered is to find a piecewise analytic ϕ , of finite order at ∞ , so that (1) $\phi^+ = G_0 \phi^- + g_0$. When G_0, g_0 are in H on L and G_0 is nowhere zero on L , the complete solution of (1) is already known; the same can be said of a corresponding type (2) of singular integral equations. The author solves the problem (1) and the equation (2) when G_0 (and a certain appropriate function in the case of (2)) is allowed to have at some points of L discontinuities of order < 1 or zeros of order < 1 . These developments naturally involve canonic solutions and the use of the index.

W. J. Trjitzinsky (Urbana, Ill.).

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VEKUA, N. P.

Mathematical Reviews
Vol. 14 No. 10
Nov. 1953
Analysis

7-14-54
LL

VEKUA, N. P. / The Carleman boundary problem for several unknown functions. *Soub'eniya Akad. Nauk Gruzin. SSR* 13, 9-14 (1952). (Russian)

Let L be a simple, closed, smooth contour limiting a bounded domain D^+ in the complex plane ω of $z = x + iy$; $D^- = \omega - (D^+ \cup L)$; the origin of the coordinates is in D^+ ; the angle made by the tangent to L is of class H (Hölder); $\alpha(t)$ is assigned in H on L , $\alpha'(t) \neq 0$ and $\alpha(t)$ transforms L one-to-one on itself, changing direction. It is said that $\phi(z)$ is meromorphic in D^+ (in D^-) if ϕ is analytic in D^+ (in D^-), except possibly at a finite number at most of poles, and if ϕ is continuously extendable on L . The author solves the following problem: to find a vector $\phi = (\phi_1, \dots, \phi_n)$ meromorphic in D^+ so that (1) $\phi^+[\alpha(t)] = G(t)\phi^-(t) + g(t)$ (on L), the matrix $G(t) = (G_{kj}(t))$ ($k, j = 1, \dots, n$) and the vector $g(t) = (g_1, \dots, g_n)$ being assigned in H . The case $n=1$, $\alpha[\alpha(t)] = 1$, has been solved by D. A. Kveselava [Akad. Nauk Gruzin. SSR. Trudy Tbiliss. Mat. Inst. Razmadze 16, 39-80 (1948); these Rev. 14, 152]. The homogeneous problem (1), when $n=1$ and $\alpha[\alpha(t)] = 1$, had been considered by T. Carleman [Verh. Internat. Math.-Kongress, Zürich, 1932, v. 1, Füssli, Zürich-Leipzig, 1932, pp. 131-151]. The author solves the problem completely with the aid of the theory of integral equations in the sense of principal values.

W. J. Trjitzinsky (Urbana, Ill.).

(3) main
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USSR/Mathematics - Boundary-Value Mar/Apr 52
Problem, Complex Variable

"A Boundary-Value Problem in the Theory of Functions of a Complex Variable For Several Unknown Functions," N. P. Vekua

"Is Ak Nauk SSSR, Ser Matemat" Vol XVI, No 2,
pg 157-180

Devoted to the soln of 2 boundary-value problems in the theory of functions of a complex variable. One of these problems is a generalization to the case of several unknown functions in the problem set up by T. Carleman. The other problem is a

206R72

USSR/Mathematics - Boundary-Value Mar/Apr 52
Problem, Complex Variable
(Contd)

Generalization of Riemann's problem for a system of eqs. Submitted by Acad N. I. Muskhelishvili
9 Nov 51.

206R72

VEKUA, N. P.

Vekua, N. P. On a problem of the theory of functions of a complex variable. Doklady Akad. Nauk SSSR (N.S.) 86, 457-460 (1952). (Russian)

Let L be a set of simple, closed, suitably smooth, disjoint curves in the plane, limiting a connected bounded domain D^+ ; D^- is the complement of $D^+ + L$. The author solves the problem (an extension of a problem of Hilbert) of finding a piecewise analytic vector $\Phi(s)$, of finite order at ∞ , so that on L one has $\Phi^+ = A\Phi^- + B\bar{\Phi}^- + g$, where the vector g and square matrices A, B are assigned of class H (Hölder). The method used is that of integral equations in the sense of principal values. W. J. Trjitzinsky (Urbana, Ill.).

Mathematical Review (unclassified)
May 1953, pp 439-522

Velma, N. P. On a boundary problem of linear relationship. Doklady Akad. Nauk SSSR (N.S.) 94, 173-176 (1954). (Russian)

Let D^1 be a bounded, connected domain in the plane of $z = x + iy$, its frontier L being smooth and closed, $D^+ = D^1 \cup L$; assume in D^+ the angle between the tangent to L and a

SRB 1, 2, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844,

CARD 1/2 PG - 139

SUBJECT
AUTHOR
TITLE
PERIODICAL

USSR/MATHEMATICS/Integral equations
YEKUA N.P.

On a boundary value problem of the linear conjugateness for
several unknown functions with given displacements.
Trudy Tbilissk. mat. Inst. Razmadze 21, 169-189 (1955)
reviewed 7/1956

Let D^+ be a finite domain in the plane of the complex variable $z = x + iy$ which is bounded by a simple closed, smooth curve L . The positive direction of L be that which lets D^+ at the left hand side. It is assumed that the angle which the tangent forms at L with a fixed direction, satisfies a Hölder condition. The functions $\alpha_k(t)$, $k=1, \dots, n$, given on L may have derivatives which are different from zero and may satisfy a Hölder condition; $\alpha_k(t)$ may map L biuniquely onto itself by inversion of the orientation. The problem of the present paper is to determine two meromorphic vectors $\varphi(z) = (\varphi_1, \dots, \varphi_n)$,

$$\psi(z) = (\psi_1, \dots, \psi_n) \text{ in } D^+ \text{ which satisfy the boundary condition} \quad (j=1, \dots, n)$$

$$(1) \quad \varphi_j^+ [\alpha_j(t_0)] = \sum_{k=1}^n G_{jk}(t_0) \psi_k^+(t_0) + g_j(t_0)$$

here $G_{jk}(t_0)$, $g_j(t_0)$ are functions given on L which satisfy a Hölder condition,

Trudy Tbilissk. mat. Inst. Razmadze 21, 169-189 (1955)

CARD 2/2 PG - 139

with the determinant $\|g_{jk}(t_0)\|$ nowhere vanishing on L . From this boundary value problem, for $\alpha_1(t) = \dots = \alpha_n(t)$ one obtains the problem which the author has treated in an earlier paper (Izvestija Akad. Nauk 16, 157-180 (1952)). The well known boundary value problem for several unknown functions due to Carleman results from this too.

$$(2) \quad \varphi^+[\alpha(t_0)] = G(t_0) \varphi^-(t_0) + g(t_0),$$

where $G(t_0) = \|g_{jk}(t_0)\|$, $g(t_0) = (g_1, \dots, g_n)$. Carleman has considered the homogeneous problem in the case $n = 1$, $\alpha[\alpha(t)] \equiv t$ but he has not given its complete solution. For $n = 1$, $\alpha[\alpha(t)] = t$ the problem (2) has been solved by Kveselava (Trudy Tbilissk. mat. Inst. Razmadze 16, 39-80 (1948)). For several unknown functions the author (l.c.) has solved the problem (2) under the condition

$$(3) \quad \alpha[\alpha(t)] = t.$$

In the first part of the present paper the problem (1) is solved, in the second part the solution of Carleman's problem (2) for the case that (3) is replaced by the condition

(4) $\alpha^m(t) = t$, $m > 0$ even,
 (where $\alpha^m(t) = \alpha[\alpha^{m-1}(t)]$) denotes the m -fold iterate of $\alpha(t)$ is given. The method consists in the fact that the problem is reduced to certain systems of singular integral equations of the normal type; it then leads to the general solution of the considered problems.

ВМ(УА, Н.Р.

A boundary problem of linear conjugation [with summary in Russian].
Trudy Mat. inst. AN Gruz. SSR 24:125-134 '57. (MIRA 11:3)
(Functions of complex variables)

VERVA, N.P.

A system of singular integrodifferential equations and its application
to linear conjugation problems. Trudy Mat. inst. AN Gruz. SSR 24:135-
147 '57.

(Integral equations) (Elasticity)

(MIRA 11:3)

VEKUA, N.P.

One differential boundary problem with linear conjugation for
certain unknown functions in the case of interrupted contours.
Soob. AN Gruz. SSR 21 no. 5: 513-518 N '58. (MIRA 12:5)

1. AN Gruz. SSR, Tbilisskiy matematicheskiy institut im. A.M.
Razmadze. Chlen-korrespondent AN Gruz. SSR.
(Vector analysis) (Integral equations)

VEKUA, N.P.

One boundary problem with linear conjugation for several unknown functions. Soob. AN Gruz. SSR 22 no.1:3-8 Ja '59.

(MIRA 12:5)

1. AN GruzSSR, Tbilisskiy matematicheskiy institut im. A.M. Razmadze. Chlen-korrespondent AN GruzSSR.

(Integral equations)

(Vector analysis)

36992

16.4500

S/044/62/000/003/036/092
C111/C444

AUTHOR: Vekua, N. P.

TITLE: On a method for the solution of singular integro-differential equations

PERIODICAL: Referativnyy zhurnal, Matematika, no. 3, 1962, 69, 70, abstract 3B294. ("Soobshch. AN Gruz SSR," 1959, 23, no. 2, 129-134)

TEXT: It is shown that the solution of the system of integro-differential equations

$$A(t) \frac{du(t)}{dt} + B(t)u(t) + \int_L \frac{K(t, \xi) u(\xi) + \Gamma(t, \xi) \frac{du(\xi)}{d\xi}}{\xi - t} d\xi = f(t)$$

can be reduced to the solution of the system of integral equations

$$\mu(t) + \int_L \left[\frac{b(t, \xi)}{\xi - t} + \phi(t, \xi) \right] \mu(\xi) d\xi = \varphi(t) \quad (1)$$

by use of the method of A. I. Nekrasov (Ob odnom klasse integro-diffe-

Card 1/2

On a method for the solution ...

S/044/62/000/003/036/092
C111/C444

rentsial'nykh uravneniy [On a class of integro-differential equations]
Tr. Ts AGI, 1934, no. 190).

$A(t)$, $B(t)$, $K(t, \xi)$, $\Gamma(t, \xi)$, $b(t, \xi)$, $\phi(t, \xi)$ are $n \times n$ matrices, L is
an open smooth curve of the complex plane. (1) is a singular integral
equation of the normal type, if there is

$$\det (E \pm \Gamma(t, t) A^{-1}(t)) \neq 0 .$$

[Abstracter's note: Complete translation.]

Card 2/2

16.4500

S/044/62/000/006/034/127
B158/B112

AUTHORS: Vekua, N. P., Isakhanov, R. S.

TITLE: One class of singular integral equations effectively solvable

PERIODICAL: Referativnyy zhurnal. Matematika, no. 6, 1962, 77,
abstract 6B324 (Soobshch. AN CruzSSR, v. 23, no. 3, 1959,
257 - 264)

TEXT: A linear singular equation

$$a(t_0)\varphi(t_0) + \frac{b(t_0)}{\pi i} \sum_{p=0}^{n-1} \int_{L_0} \frac{\varphi(t)}{t-\omega_p(t_0)} dt + \sum_{q=1}^m A_q(t_0) \int_{L_0} B_q(t)\varphi(t) dt = f(t_0), \quad (1)$$

where L is a simple closed smooth contour on the plane of a complex variable $\zeta = x + iy$, $a(t_0)$, $b(t_0)$, $A_q(t_0)$, $B_q(t_0)$, ($q = 1, 2, \dots, m$).

$f(t_0)$ are given functions from the Hölder class, $\varphi(t)$ is an unknown function also from the Hölder class, $\omega_0(t_0) \equiv t_0$, $\omega_1(t_0), \dots, \omega_{n-1}(t_0)$ are

Card 1/2

One class of singular integral ...

S/044/62/000/006/034/127
B158/B112

linear rational functions forming a group. It is shown that by certain substitutions of the variables this equation may be reduced to an equation integrable in closed form. [Abstracter's note: Complete translation.] ✓

Card 2/2

VEKUA, N.P.

Comments on my article "A boundary problem in linear conjugation
for several unknown functions." Soob. AN Gruz. SSR 24 no. 1:3-6
Ja '60. (MIRA 14:5)

1. Akademiya nauk Gruzinskoy SSR, Tbilisskiy matematicheskiy
institut im. A.M. Razmadze. Chlen-korrespondent AN GruzSSR.
(Differential equations)

32498

S/044/61/000/011/021/049

C111/C444

16.4500

AUTHOR: Yekus, N. P.

TITLE: Linear integrodifferential equations with small parameters at the highest derivatives

PERIODICAL: Referativnyy zhurnal, Matematika, no. 11, 1961, 43, 44, abstract 11B218. (Probl. mekhaniki sploshn. sredy, M., AN SSSR, 1961, 92 - 100)

TEXT: Let
$$L_\varepsilon y = \sum_{k=0}^m a_{m+k} \varepsilon^k y^{(m+k)}(t) + \sum_{j=0}^{m-1} [a_j(t) y^{(j)}(t) + A_j], \quad (1)$$

where

$$A_j = \int_0^1 K_j(t, \tau) y^{(j)}(\tau) d\tau, \quad a_{m+k} = \text{const} \quad (k=0, 1, \dots, m).$$

$a_m \neq 0$, $a_{m+1} = 1$, $a_j(t)$ is continuous on $[0, 1]$, $(j = 0, \dots, m-1)$, ε is a small parameter, $K_j(t, \tau)$ is continuous for $t, \tau \in [0, 1]$.

Considered is the Cauchy problem (k_ε) for the equation $L_\varepsilon y(t) = f_\varepsilon(t)$

Card 1/3

Linear integrodifferential equation...

32498
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C111/C444

with the initial conditions $\rho^{(j)}(0) = 0$ ($j = 0, 1, \dots, m+1$); one supposes that for the continuous function $f_\varepsilon(t)$ it holds $f_\varepsilon(t) = f(t) + O(\varepsilon)$, the equation $\sum_{k=0}^1 a_{m+k} \rho^k = 0$, does not possess any

multiple roots, and that the real parts of the roots ρ_k are negative.

Besides the Cauchy problem (k_0) is considered for the degenerated equation ($\varepsilon = 0$): $\rho^j(0) = 0$, ($j = 0, 1, \dots, m-1$). It is proved that $\lim_{\varepsilon \rightarrow 0} \rho_\varepsilon(t) = \rho(t)$, $\rho_\varepsilon(t)$ being the solution of the problem (k_ε) , and $\rho(t)$ being the solution of the problem (k_0) . Then the problem (k_ε) is investigated for the equation $L_\varepsilon^* \rho_\varepsilon(t) = f_\varepsilon(t)$. $L_\varepsilon^* \rho_\varepsilon$ distinguishes from $L_\varepsilon \rho_\varepsilon$ by the fact that in the second part of (1) there is

$$A_j = \int_0^t \frac{\Gamma_j(t, \tau) \rho_\varepsilon(\tau)}{\tau - t} d\tau$$

where the integral is understood in the sense of the Cauchy principal

Card 2/3

Linear integrodifferential equation .
value, and $\Gamma_j(t, \tau)$ satisfies the Hölder condition on $[0, 1]$ with
respect to both variables. Besides the problem (k_0) is considered for
the degenerated equation. It is proved that if the problem (k_0) does
possess a unique solution in this last case, then the problem (k_ε)
has a unique solution $p_\varepsilon(t)$ for sufficiently small ε , which converges
for $\varepsilon \rightarrow 0$ to the solution of problem (k_0)

32498
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C111/C444

[Abstracter's note: Complete translation]

Card 3/3

VEKUA, N.P.; TSITSKISHVILI, A.R.

All-Union Conference on the Application of Methods of the Theory
of Functions to Problems of Mathematical Physics, held at Tbilisi.
Usp. mat. nauk 16 no.4:243-247 J1-Apr '61. (MIRA 14:8)
(Tiflis--Mathematics--Congresses) (Functions)

"APPROVED FOR RELEASE: 09/01/2001

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ACCESSION NO. AP5007269

STATE DEPARTMENT OF THE ARMY

APPROVED FOR RELEASE: 09/01/2001

CIA-RDP86-00513R001859310007-7"

L 45390-66 EWT(d) IJP(c)

ACC NR: AR6016607

SOURCE CODE: UR/0044/65/000/012/B048/B049

AUTHOR: Vekua, N. P.

TITLE: System of nonlinear differential equations with small parameter

SOURCE: Ref. zh. Matematika, Abs. 12B260

REF SOURCE: Tr. Tbilissk. un-ta, v. 110, 1965, 25-32

TOPIC TAGS: nonlinear differential equation, differential equation system, small parameter

ABSTRACT: Consider the system of nonlinear differential equations with small parameter

$$\varepsilon \frac{dx_i}{dt} = X_i(x_1, \dots, x_n) = p_{i1}x_1 + \dots + p_{in}x_n + X_i^*(x_1, \dots, x_n), \quad (1)$$

where $\varepsilon > 0$ is a small parameter, p_{ik} are constants, $X_i^*(x_1, \dots, x_n)$ in some region $|x_1| < h$ are decomposed into series in powers of x_1, x_2, \dots, x_n , beginning with terms of not less than second order. By using the substitution $t = \varepsilon \tau$, one can rewrite system (1) as:

$$\frac{dx_i}{d\tau} = p_{i1}x_1 + \dots + p_{in}x_n + X_i^*(x_1, \dots, x_n). \quad (2)$$

Card 1/2

UDC: 517.917

L 45390-66

ACC NR: AR6016607

Now using known theorems of Lyapunov for this system, one finds that the following assertion holds: Let $\lambda_k = \mu_k + i\nu_k$ be the roots of the characteristic equation of the approximate system

$$\det(P - E\lambda) = 0, \quad (3)$$

where E is the identity matrix, $P = \|p_{ik}\|$. As $\varepsilon \rightarrow 0$ the limit of the solution of the Cauchy problem for system (1) coincides with the solution of the degenerate system if and only if $\mu_k < 0$, i.e., if the solution $x_1 = 0$ of system (2) is asymptotically stable. Note, finally, that an analogous assertion holds under more general conditions with respect to X_1 and also in many cases where X_1 contains the parameter t explicitly. Author's resumé [Translation of abstract]

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